Homework Assignment # 4

Math 440/540
Kaul
Winter 2015
Due Thursday, February 19

Instructions: To receive full credit, each solution must be neat and legible. Explain your reasoning fully and use complete sentences – an answer without an explanation will receive no credit. Staple the homework sheet to the front of your work.

1. G & G p. 78 # 3
2. G & G p. 81 # 6
3. Prove the Extreme Value Theorem: If $X$ is compact and $f : X \to \mathbb{R}$ is continuous, then there exist $a, b \in X$ such that $f(a) \leq f(x) \leq f(b)$ for all $x \in X$.
4. G & G p. 85 # 3
5. G & G p. 88 # 4
6. Prove the Intermediate Value Theorem: Let $X$ be connected and $f : X \to \mathbb{R}$ continuous. If $a, b \in X$ and $r \in \mathbb{R}$ is between $f(a)$ and $f(b)$, then there exists $c \in X$ such that $f(c) = r$.
7. G & G p. 90 # 3